

**IMPACTS OF INFORMATION TECHNOLOGIES**  
**Division of Science Resources Studies**  
**Directorate for Social, Behavioral, and Economic Sciences**  
**National Science Foundation**  
**Updated February 22, 1999**  
**by Eileen L. Collins**

## **Introduction**

As computing and communications expand into ever more aspects of our lives, increased information about the social and economic dimensions of these technologies is sought by the public, decision makers, and the science and technology communities. Reflecting this growing interest, the *GPRA Strategic Plan* of the National Science Foundation (NSF) <sup>1</sup> commits the Division of Science Resources Studies (SRS) to "develop analyses of the impact of information, communications, and computational technologies on America's quality of life."

This status report summarizes SRS activities directed to analysis of the impacts of information technologies (IT, including technologies for data storage and retrieval, computing, and communications).

## **"Fostering Research on the Economic and Social Impacts of Information Technology"**

This project explored existing understanding of the impacts of computing and communications and established a baseline for further study.

The project was co-funded by SRS and the NSF Directorate for Computer and Information Sciences (CISE) and coordinated with the NSF Division of Social and Economic Sciences (SES). It was conducted by the National Academy of Sciences (NAS), with Hal Varian as Chair of the Expert Steering Committee, Marjory Blumenthal as the Principal Investigator (PI), Jane Bortnick Griffith as Interim Director (1998), and Jon Eisenberg and Paul Semenza as Program Officers. The project report is posted on the NAS web site (<http://www2.nas.edu/cstbweb/>) and hot-linked to the SRS web site.

---

<sup>1</sup> The *GPRA Strategic Plan* of NSF was prepared in response to the Government Performance and Results Act (GPRA) and submitted to Congress in September, 1997. It is on the NSF web site at <http://www.nsf.gov/od/gpraplan/gpraplan.htm>.

The project revealed that

- The range of potential impacts from IT is so vast, nobody fully understands their shape, size, and dynamics.
- There are many individual studies of IT in specific settings; but there is no directory of sources or comprehensive overview of what data exist, much less an integrated picture of what the evidence says.
- Researchers tend to be most familiar with work in their particular area. They may be unaware of relevant research by others. Policy analysts often find it difficult to locate existing studies, much less determine what they all add up to.
- Multidisciplinary research is needed to capture the complex set of multicausal, multidimensional outcomes of the uses of information technologies.
- In view of the vastness of the terrain, research must proceed by partitioning the growing universe of IT applications into manageable domains, perhaps along lines of key technologies, key areas of society or the economy, or key functions necessary to the conduct of social and economic life.
- The sharing, development, and application of empirical evidence in research and policy analyses could be facilitated through construction of comprehensive web-based information resources, regularly updated reviews of literature summarizing the state of the art in various fields, and other communication mechanisms.

In response to the NAS project and conversations with the research and policy communities, SRS has begun an initiative

- To build understanding of the social and economic implications of IT.
- To facilitate sharing of data and information.

### **"Charting the Impacts of Information Technology"**

Eileen L. Collins of the SRS staff presented this paper at the December 12-14, 1997, "Workshop on Science, Engineering, and Quality of Life: Research Outcome Models" in Elkridge, Maryland. The paper provides a conceptual overview of the analytical challenge inherent in assessing the impacts of information technologies and an informal taxonomy of the kinds of impacts that

have been identified in earlier research. The paper is available on the SRS web site.<sup>2</sup>

### **"The Social and Economic Impacts of Information Technologies: Road Maps to Data and Research"**

With cooperative funds from CISE, SRS launched a pilot project to identify all major data collections, research, and analyses relevant to understanding the social and economic impacts of IT and to place them in a searchable data base on the SRS web site. Coverage will include implications of IT for commerce, employment, productivity, institutional restructuring, globalization, government, research, education, the home, and community.

The project is being conducted by SRI International under the overall direction of Catherine P. Ailes, with co-researchers Nils C. Newman, Robert K. Carr, J. David Roessner, and Roland Bardon.

### **"The Application and Impact of Information Technologies in the Home--Where Are the Data and What Do They Say?"**

This project will provide an overview of what existing data and research say about the impact of IT in the home. The project was co-funded with CISE and SES and is being conducted by SRI International under the overall direction of Catherine P. Ailes, with co-researchers Nils C. Newman and Maria Papadakis.

Planned products include an annotated bibliography and integrated overview report and will be mounted on the SRS web site.

### **"Impacts of Information Technologies on Employment and Work in Service and Related Sectors: What Do the Data and Research Say?"**

In 1999, SRS will initiate work on an overview of what existing data and research say, and do not say, about the impacts of information technologies on employment, work, and working in the service and other non-manufacturing sectors. The resulting cluster of reports will be posted on the SRS web site.

---

<sup>2</sup> The SRS web site is <http://www.nsf.gov/sbe/srs/stats.htm>.

## **"Intellectual Property Rights and the Emerging Information Infrastructure"**

Because the applications and impacts of information technologies are conditioned by the available infrastructure, SRS contributed along with several CISE and SES programs to funding of this project at NAS with Randall Davis as Chair of the Expert Steering Committee, Marjory Blumenthal as PI, Jane Bortnick Griffith as Interim Director (1998), Jerry R. Sheehan as Senior Program Officer, and Alan S. Inouye as Program Officer.

The project will convene a series of expert meetings and workshops to assess issues and derive recommendations for policy and research related to (1) the nature, evolution, and use of the Internet, Federal networks, and other interconnected networks, and (2) the generation, distribution, and protection of content accessed via networks, with particular attention to balancing the needs of commercial publishers against those of the research, education, and library communities. At SRS request, the project includes a module to assess the kinds, quality, and sufficiency of available data for measuring and analyzing relevant trends in the supply of and demand for networked information services and associated electronic publishing of various kinds.

A final project report, including the data assessment, is planned for 1999. It will be posted on the NAS web site and hot-linked to the SRS web site.

## **Complementary Work In SRS**

The 1998 *Science and Engineering Indicators*<sup>3</sup> chapter, "Economic and Social Significance of Information Technologies" focuses on benchmarking key dimensions of the growing role of IT in the economy, in K-12 education, and in our lives—with special reference to equity and privacy. The chapter concludes with an outline for planned development of metrics for tracking the locus of IT applications in society and the economy.

More generally, the many SRS surveys and studies of science and technology include computer or computer-related categories when there are subject-area or industry breakouts.

---

<sup>3</sup> Now at <http://www.nsf.gov/sbe/srs/stats.htm>.

**Please Send Comments or Questions about IT Impact Studies in SRS to**

Dr. Eileen L. Collins  
Senior Assessment Studies  
Coordinator and Manager  
Division of Science Resources Studies  
National Science Foundation  
4201 Wilson Blvd., Room 965  
Arlington, VA 22230

Internet [ecollins@nsf.gov](mailto:ecollins@nsf.gov)  
FAX 703-306-0508  
Phone 703-306-1773 x6932

**Please Send Comments or Questions about Science and Engineering Indicators in SRS to**

Ms. Jennifer Sue Bond  
Program Director  
Science and Engineering Indicators  
Division of Science Resources Studies  
National Science Foundation  
4201 Wilson Blvd., Room 965  
Arlington, VA 22230

Internet [jbond@nsf.gov](mailto:jbond@nsf.gov)  
FAX 703-306-0508  
Phone 703-306-1777 x6926